



**User Manual – Aero 152A-WD
Portable CO Detector**

**Guardian Avionics
1951 E Airport Drive
Tucson, AZ 85756
520-889-1177**

**support@guardianavionics.com
www.GuardianAvionics.com**

USER'S MANUAL AERO-152A-WD

What is Carbon Monoxide?

Carbon Monoxide (CO) is a colorless, odorless, tasteless and toxic gas produced as a by-product of combustion. An estimated 10,000 people are affected by carbon monoxide poisoning each year in the United States. Eight hundred to 1,000 die.

Carbon Monoxide results from incomplete combustion of fuel burning generated from an engine, vehicle, appliance, tool or other device. Each has the potential to produce dangerous levels of carbon monoxide gas. This is a particular problem in motor vehicles, where carbon monoxide can leak into the passenger compartment and accumulate to dangerous levels.

The average healthy adult might not feel any symptoms. People with cardiac or respiratory problems, infants, unborn babies, pregnant mothers, or elderly people can be more quickly and severely affected by CO.

Carbon Monoxide Poisoning - Don't count on symptoms of carbon monoxide to warn you: It's colorless, odorless, and tasteless even though it is usually found mixed with exhaust gases and fumes. If you smell fumes or feel any of the following symptoms, and your CO Guardian is going off, you should assume that carbon monoxide is present. Symptoms include: feeling of sluggishness, warmth, and tightness across your forehead followed by headache, a throbbing pressure at the temples and ringing in the ears. Severe headache, nausea, dizziness, and dimming of vision may follow.

NOTE: CO Guardian units detect CO. They do not detect fire, smoke or other gases.

What do I do if Carbon Monoxide has entered the cabin during flight or while driving?

If any of the previously mentioned physical conditions exist, do the following:

- Shut off the heater, air conditioning or any other opening to the engine compartment.
- Open a fresh air source immediately.
- Don't smoke.
- Use 100% oxygen if possible.
- Land as soon as possible (aircraft only).
- Be sure the source of the contamination is corrected before further flight or usage of the vehicle

Where to Install your CO Guardian:

Portable Models:

The portable CO Guardian units have been designed to be plugged into a standard cigarette lighter (12V/28V, see specifications) inside your cockpit/auto/recreational vehicle. The unit has been built to fit snugly, with a special locking system so it will not dislodge due to vibration. Since the unit is designed to fit tightly into the adapter, you may even need to press the unit with a fair amount of force into the cigarette lighter adapter.

If you don't have a cigarette lighter connector or want to install an additional one, the best place to install is in the panel/dash midway between the floor and the inside roof of your cockpit/auto/recreational vehicle.

CO Guardian: Description of units

Your CO Guardian uses "state of the art technology" to detect and alert you before dangerous levels of CO build up in your cockpit/auto/recreational vehicle. This will alert you with enough time to take action before the presence of CO begins to affect your health.

Sensor

CO Guardian uses a new generation of gas sensors with "state of the art" solid-state technology. Its extremely reliable sensor monitors the presence of CO inside your cockpit / automobile.

Buzzer

Produces a loud beep, 85 dB @ 2.4 KHz

Lights

The CO Guardian indicates the presence of CO using a three-color light indication:

Green: this is the normal condition; means CO is not present or the CO level is negligible - below 50PPM.

Yellow: Presence of traces of CO usually not exceeding 70PPM.

Red: Presence of CO greater than 70 PPM

(Alarm levels specific to the model you have purchased, is given subsequently in this manual).

Numerical display (Not for all models)

The digital display indicates the CO level in PPM (Parts Per Million).

To minimize power consumption, the digital display will remain OFF as long as no CO is in your cockpit/auto/recreational vehicle.

Micro-controller

CO Guardian combines a high performance "state of the art" micro-controller, with a highly reliable sensor in a small and compact casing to provide the best CO detector.

The CO sensor sends information to the micro-controller, which is programmed to calculate the CO level constantly, and compare the CO level within a certain period of time. This will trigger the alarm before a dangerous level of carboxihemoglobin builds up in your blood.

Understanding your CO Guardian

Powering-up the unit

- Plug your unit into a standard cigarette lighter (Portable models).
- This unit is designed for input voltage ranging from 12 to 30 volts DC only.

Self-check routine

Every time you power up the unit, a self-test routine begins. The test checks for functionality of the critical components such as the CO sensor, temperature sensor, humidity sensor, and the integrity of the whole system. Before start-up, always check the operation of the unit.

(Self check routine/ sequence specific to Aero 152A-WD is given subsequently in this manual).

Maintenance

Taking care of your CO Guardian:

- Your CO Guardian needs very little maintenance. Perform the self-test routine before start-up.
- Keep the sensor free of dust, and vacuum the CO Guardian vents periodically with your vacuum cleaners soft brush. If needed, the CO Guardian may be wiped or dusted with a dry cloth or duster.
- If the detector is not being used frequently, it is a good practice to keep it powered-on for about 1 or 2 hours once a month. You could do this by plugging it into the cigarette lighter receptacle of your car. This is good for the CO sensor in the detector.

Replacing the fuse: (Portable models)

Using a standard slotted screwdriver, remove the fuse holding nut at the nose by turning counter clockwise. Be careful not to lose the spring behind the fuse. Replace with new fuse (See Specs.) and check the operation of the unit.

Check the circuit breaker panel (All models).

Note: This product is intended for use in enclosed areas occupied by humans. Because of the sensitivity, it is not designed to measure compliance with UL 2034, OSHA, or other industrial standards.

LIMITED WARRANTY

Important: Do not attempt to open unit. If unit is opened, warranty will be void.

This product has a limited warranty for 12 months from date of purchase.

Your unit has a Serial Number. Please check that the unit you receive has the same serial number as shown in your invoice.

For Warranty Service:

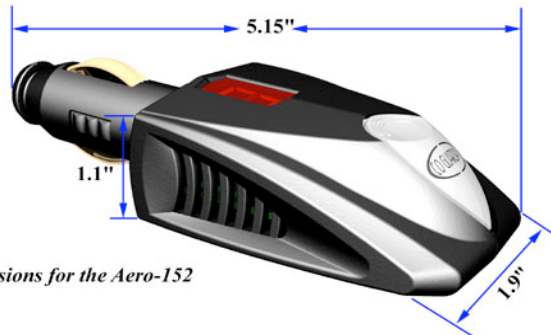
In case you experience any problems with the unit, you may contact our customer service department at 1-800-639-7139 for assistance. Even if you have purchased the unit from one of our distributors, you can contact us directly at the following address for technical support or in case you have any problems with your unit:

CO Guardian LLC.
1951 East Airport Drive
Tucson, AZ 85706
Tel 520-889-6327; Fax 520-889-8249; Email support@guardianavionics.com

(If you have purchased the unit from our distributors, you may need to retain proof of purchase to avail warranty service from us.)

Product Specifications for Aero 152A-WD:

- Power supply: 12/28 VDC, from a standard cigarette lighter
- Power consumption: 1 W
- Fuse: Use GMI type, fast acting fuse 3A 250V(All models), size 5x20 mm (Aero-152A-WD)
- Temperature range: 30 F to 120 F
- Humidity range: 10-90% RH
- Sensor calibration: Each unit calibrated at 100 PPM and 500PPM
- Sounder alarm: 85 dB at 10' @ 2,4 kHz
- Unit malfunction: 1 beep every 30 seconds, and the corresponding flashing light (see troubleshooting)
- Test/reset button: Every time you push the test button the unit will go to a self-check routine after the reset condition (unit will reset in the event of an alarm)
- Weight: 2.4 oz (without packing)
- Size: 5" (length) x 1.9" (width) x 1.1" (height) (Aero-152A-WD)



SELF CHECK SEQUENCE: 152A-WD:

- Buzzer beeps 2 times.
- Flashing Green Light.
- Flashing Yellow Light
- Flashing Red light.
- Steady Green light comes ON.
- 8 seconds pause.
- Buzzer beeps once.
- Quick flashing Yellow light once.
- Green remains ON, Other lights OFF.

Resetting the unit:

Pressing the Test / Reset button (All models) during an alarm condition will silence the buzzer for a short period of time, typically 90 seconds. The unit will go for a self-check routine, and if there is still a high level of CO (above 50 PPM), the buzzer and the corresponding color light will automatically re-activate. If the CO has dissipated, the unit will go to a normal status; the Green Led is ON until a new condition alarm occurs.

Troubleshooting

Visual and audible signals

In order to check for a possible error, either unplug the unit and then plug back in (Aero-152A-WD), or press the Test/Reset button (All models). If, after the self-test routine, the unit doesn't go to a normal status with the green light on, check for the following:

- 1) Flashing Green, Red, and Yellow light indicate a problem associated with the CO Sensor
- 2) Flashing Red light: A problem associated with the temperature sensor.
- 3) Flashing Yellow light: A Problem associated with the humidity sensor
- 4) Any other combination of flashing lights (that is not a normal or Condition alarm) will indicate a problem with the micro- controller.
- 5) The unit does not operate at all. A possible problem associated with the fuse (see replacing the fuse), or there is no power to the cigarette lighter adapter.

For 1 to 4 above, you will hear a short beep every 30 seconds. Contact us for technical support if you experience any of the above conditions.

Important: If the unit shows alarm signals (flashing yellow or red lights) and you are reasonably certain there is no CO present, first try the following remedial action before you call us :

Keep the unit powered up in your car for about 2 hours (simply disregard any alarms during this period). In most cases, the unit should revert back to its normal state, as the sensor will clear itself from any previously detected traces of CO. If alarm persists even after powering up the unit for about 2 hours, there is some problem with the sensor or with the unit calibration, in which you need to call us 1-800-639-7139 for warranty service.

ALARM CONDITIONS:

CO LEVEL RANGE IN PPM (PARTS PER MILLION)	LIGHT INDICATION	BUZZER	BUZZER AND LED ALARM WILL GO AFTER
LESS THAN 40 PPM	GREEN		
40 PPM	GREEN		
50 PPM 60 PPM	YELLOW YELLOW	BEEPS	10 MINUTES
70 PPM 80 PPM 90 PPM	RED RED RED	BEEPS BEEPS BEEPS	5 MINUTES 5 MINUTES 5 MINUTES
100 200 300	RED	BEEPS	5 MINUTES 3 MINUTES 1 MINUTES
400 500 600 700 800	RED	BEEPS	IMMEDIATELY
Above 900	RED	BEEPS	IMMEDIATELY

Note:

The audio and visual alarms will be triggered after a gap determined by the intensity of the CO level. For lower levels of CO the alarm will sound after a delay, where as for higher levels of CO, the alarm will sound almost instantaneously. This time chart is shown below:

- 50-70 PPM alarm goes after 10 minutes.
- 70-150 PPM alarm goes after 5 minutes.
- 200 PPM alarm goes after 3 minutes.
- 300 PPM alarm goes after 1 minute.
- Above 400 PPM alarm goes instantly.

Note: During an alarm cycle if you wish to silence the audio buzzer, simply press the test / reset button once. The unit will go through the test cycle during which it will follow the self check routine, and there-after it will revert to the alarm conditions if CO is still present, but the buzzer will remain silent from now on. The yellow or red lights will continue to display the alarm conditions till the presence of CO is fully removed.

The buzzer will, however, resume its normal operation for the next alarm cycle. This is to make sure that once the pilot has been alerted about a CO problem, thereafter he is not distracted continuously by the audio alarm. If the pilot chooses this option of silencing the buzzer during an alarm condition, thereafter he needs to go by the visual indications for the remaining part of the alarm situation.

Caution: *Do not hold the unit directly into exhaust gases from an automobile to test its functionality.* The hot exhaust gases from an automobile can damage the CO sensor inside the unit permanently. Moreover, the CO present in the exhaust gases dissipate into the atmosphere almost immediately after it leaves the exhaust, and the unit will not detect CO during such a test. We would like to assure our customers that each unit is tested by us in controlled conditions in a calibrated CO test chamber at two stages during manufacture, and a unit is cleared for shipping only after it clears both tests.

Re-calibration:

Although the CO sensors in our CO detectors have a life of 5 to 7 years under ideal conditions and if protected from all external contaminants, we recommend a re-calibration of the units after 3 years. The CO sensor is very sensitive, and certain external substances in the ambient air can change its characteristics and affect its reliability.

The re-calibration can be done by us for a flat fee of \$99.00 for all models. This service includes installation of a new CO sensor, re-calibration, and a complete system check. You get a fresh 12-month warranty.